General

Guideline Title

Perioperative protocol. Health care protocol.

Bibliographic Source(s)

Card R, Sawyer M, Degnan B, Harder K, Kemper J, Marshall M, Matteson M, Roemer R, Schuller-Bebus G, Swanson C, Stultz J, Sypura W, Terrell C, Varela N. Perioperative protocol. Health care protocol. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2014 Mar. 124 p. [124 references]

Guideline Status

This is the current release of the guideline.

This guideline updates previous versions: Danielson D, Bjork K, Card R, Foreman J, Harper C, Roemer R, Stultz J, Sypura W, Thompson S, Webb B. Preoperative evaluation. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2012 Jul. 61 p. [36 references]

Sawyer M, Danielson D, Degnan B, Dickson E, Doty S, Hamlin C, Harder K, Harper C, Matteson M, Moes R, Roemer R, Schuller-Bebus G, Swanson C, Terrell C, Webb B, Weisbrod C. Perioperative protocol. Health care protocol. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2012 Nov. 102 p. [147 references]

Regulatory Alert

FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- December 14, 2016 – General anesthetic and sedation drugs : The U.S. Food and Drug Administration (FDA) is warning that repeated or lengthy use of general anesthetic and sedation drugs during surgeries or procedures in children younger than 3 years or in pregnant women during their third trimester may affect the development of children's brains. Consistent with animal studies, recent human studies suggest that a single, relatively short exposure to general anesthetic and sedation drugs in infants or toddlers is unlikely to have negative effects on behavior or learning. However, further research is needed to fully characterize how early life anesthetic exposure affects children's brain development.

Recommendations

Major Recommendations

Major Recommendations

Note from the National Guideline Clearinghouse (NGC) and the Institute for Clinical Systems Improvement (ICSI): This revision of the ICSI Perioperative Protocol has a number of important changes and evolutions from previous versions in addition to incorporating the latest literature into the recommendations and protocol. It has combined two previously separate documents – the Preoperative guideline and the Perioperative protocol – into one comprehensive document, and the entire document has been extensively reorganized for easier reading and logical access to particular topics, elimination of redundancy and overall clarity. Evidence-based grading of the literature upon which the document is based has been utilized throughout the document. There are new recommendations on minimization of environmental hazards.

ICSI has made a decision to transition to the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system. This document is in transition to the GRADE methodology. Transition steps incorporating GRADE methodology for this document include the following:

- Priority placed upon available systematic reviews in literature searches.
- All existing Class A (RCTs) studies have been considered as high quality evidence unless specified differently by a work group member.
- All existing Class B, C and D studies have been considered as low quality evidence unless specified differently by a work group member.
- All existing Class M and R studies are identified by study design versus assigning a quality of evidence.
- All new literature considered by the work group for this revision has been assessed using GRADE methodology.

For a detailed description of what has changed since the previous version of this protocol, refer to Summary of Changes Report – March 2014 (see the "Guideline Availability" field). In addition, in 2011, ICSI made a decision to transition to the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system. This document is in transition to the GRADE methodology.

The recommendations for perioperative protocol are presented in the form of a table with a list of evidence-based recommendations, and detailed annotations (the annotation number is provided for each recommendation in the recommendation table.)

Quality of evidence (Low Quality, Moderate Quality, and High Quality) and strength of recommendation (Weak or Strong) definitions are repeated at the end of the "Major Recommendations" field.

As part of a grant from the American Board of Internal Medicine (ABIM) Foundation, ICSI is supporting the national *Choosing Wisely® Campaign*. The campaign's goal is to help physicians and patients talk about medical tests and procedures that are often used but may not be necessary and may in some cases cause harm. The *Choosing Wisely* logo will appear in the original guideline document whenever a recommendation from a medical specialty society participating in the *Choosing Wisely Campaign* is in alignment with ICSI work group recommendations.

Clinical Highlights

- Provide a comprehensive preoperative basic health assessment for all patients undergoing a diagnostic or therapeutic procedure as defined in the protocol. (*Annotation #1*)
- Most laboratory and diagnostic tests including electrocardiograms are not necessary with routine procedures unless a specific indication is present. (*Annotation #1.21*)
- Patient education and instruction strongly influence perioperative outcomes (e.g., medication management, apnea screening, nicotine cessation and surgical site infection). (*Annotation #4; Aim #3*)
- Preoperative verification process includes patient identification, procedure(s), site(s), laterality and level. This process is confirmed by source documents, consent form, medical record and discussion with the patient. Additional verification must occur at designated points in the perioperative period. (*Annotation #5*)
- All procedure sites, including level, position, laterality, multiple sites/digits in the same anatomic location, and bilateral procedures will be marked with the surgeon's initials. The surgeon should follow the preoperative verification process prior to marking the sites. Surgeon initials must be visible at time of incision. Note: An anatomical diagram shall be used to identify surgical site(s) that are not visible through the surgical drape. (*Annotation #6*)
- A Time-Out will be performed just prior to the start of the procedure (after the surgeon has scrubbed and gowned), with active verbal confirmation by all the professionals involved in the care of the patient. A repeat Time-Out will be performed for multiple procedures or position changes. An intraoperative pause shall be performed for all procedures that involve level, implants and/or laterality after an orifice or midline entry. (*Annotation #10*)
- A pre-procedure briefing will be conducted. The purpose of the briefing is to present the plan for the procedure and confirm with the team members what will be needed during the procedure and when it will be needed. (*Annotation #15*)
- When a hand-off is required, a structured process should be followed. (*Annotation #15*)
- A Hard Stop will occur when either the verification process is incomplete and/or a discrepancy is identified. The procedure will not proceed until the discrepancy is resolved. (*Annotation #12*)

- Baseline counts should be effectively and reliably performed for all countable items. (*Annotation #16.11*)
- Imaging is required if the final count is unable to be reconciled. (*Annotation #16.12*)

Annotations

1. Preoperative Basic Health Assessment and Medication Review
   Recommendation:

   - A preoperative basic health assessment must be completed for all patients undergoing a diagnostic or therapeutic procedure (exceptions are addressed below) (*Strong Recommendation, Low Quality Evidence*).

   From the Society of General Internal Medicine: http://www.choosingwisely.org/doctor-patient-lists/society-of-general-internal-medicine/

   Don't perform routine preoperative testing before low-risk surgical procedures.

   Preoperative assessment is expected before all surgical procedures. This assessment includes an appropriately directed and sufficiently comprehensive history and physical examination, and in some cases, properly includes laboratory and other testing to help direct management and assess surgical risk. However, preoperative testing for low-risk surgical procedures (such as cataract extraction) results in unnecessary delays and adds to significant avoidable costs and should be eliminated.

   This protocol follows the basic premise that diagnostic tests (laboratory and x-ray) are not a part of the preoperative basic health assessment.

   A preoperative basic health assessment includes:

   - Medical history
     Indication for surgical procedure

     Allergies and intolerances to medications, anesthesia or other agents (specify reaction type)

     Known medical problems

     Surgical history

     Trauma (major)

     Current medications (prescription, over-the-counter medications, herbal and dietary supplements)

     Focused review of issues pertinent to the planned anesthesia and procedure:

     - Current status of pertinent known medical problems
     - Cardiac status
     - Pulmonary status
     - Functional status (the ability to perform at four or more metabolic equivalents [METs]) [*Reference*]
     - Hemostasis status (personal or family history of abnormal bleeding)
     - Possibility of severe (symptomatic) anemia
     - Possibility of pregnancy
     - Past personal or family history of anesthesia problems
     - Smoking, alcohol history and illicit drugs
     - Risk factors for development of surgical site infection (e.g., smoking, diabetes, obesity, malnutrition, chronic skin disease)
     - A basic nutritional assessment should be considered on all patients undergoing surgery as malnutrition is a known risk factor for decreased wound healing and increased surgical site infections. Lab verification should be reserved for those patients at risk of malnutrition.
   - Physical examination
     Weight, height and body mass index

     Vital signs – blood pressure, pulse (rate and regularity), respiratory rate

     Cardiac

     Pulmonary

Other pertinent exam

1.1 Basic Health Assessment

A preoperative basic health assessment as outlined in this protocol is required for all patients undergoing a diagnostic or therapeutic procedure, regardless of setting, except for:

- Otherwise healthy patients receiving peripheral nerve blocks, local or topical anesthesia, and/or no more than 50% nitrous oxide/oxygen and no other sedative or analgesic agents administered by any route – for example, most dental procedures or excision of simple skin lesions.
- Patients receiving "sedation/analgesia" (often referred to as "conscious sedation") defined as "a state that allows patients to tolerate unpleasant procedures while maintaining adequate cardiopulmonary function and the ability to respond purposefully to verbal command and/or tactile stimulation." This technique is commonly used for procedures such as endoscopy and bronchoscopy, and may be used for certain surgical procedures. Patient history must be available at the time they receive sedation/analgesia.

Although the preoperative basic health assessment is not specifically required for sedation/analgesia and other minor procedures, a limited preoperative assessment and documentation is required and mandated by The Joint Commission and other organizations.

[Reference]

The patient needs to be aware that the preoperative assessment is not a substitute for preventive services, but the preoperative evaluation may be used as an opportunity to address preventive services.

1.2 Preoperative Testing

Abnormal findings (noted on the preoperative basic health assessment) are results that require further evaluation to assess and optimize any surgical/anesthesia risk or cares. Examples include patients on diuretics requiring a potassium level, patients with chest pains on exam or patients with markedly elevated blood pressure. Children's abnormal findings may include wheezing or significant upper respiratory infections noted on the preoperative assessment. Any of these findings may have a deleterious effect on surgery/anesthesia and would require further evaluation to assess the risk to the patient.

Further evaluation may be as simple as asking a few more questions, performing further physical examination, or ordering a laboratory or radiological exam. More in-depth evaluations may be needed, such as a consultation or cardiac stress testing.

The type and extent of evaluation required should be guided by standard medical practice, focusing on the patient's underlying medical condition and the planned procedure. For example, some clinicians will order a baseline preoperative hemoglobin if significant blood loss is anticipated.

Note that most laboratory and diagnostic tests (e.g., hemoglobin, potassium, coagulation studies, chest x-rays, electrocardiograms) are not routinely necessary unless a specific indication is present and may be beyond the scope of this protocol.

Other abnormal findings, though relevant to the patient's general health, may not have any impact on the planned procedure or the timing of the procedure. Evaluation and management of these incidental findings should follow standard medical practice and are beyond the scope of the protocol.

Preoperative questionnaires used to determine abnormal findings for adult and pediatric patients are attached in Appendix B, "Preoperative Questionnaire – Adult," and Appendix C, "Preoperative Questionnaire – Pediatric," in the original guideline document.

1.21 *Electrocardiogram*

Recommendations:

- Perform electrocardiogram for all patients age 65 and over, within one year prior to procedure (*Weak Recommendation, Low Quality Evidence*).
- Electrocardiograms are not indicated, regardless of age, for those patients having cataract surgery (*Strong Recommendation, High Quality Evidence*).
- Preoperative electrocardiograms are not recommended for patients undergoing other minimal risk procedures, unless medical history/assessment indicate high-risk patient (*Strong Recommendation, High Quality Evidence*).

For high-risk patients:

- No electrocardiogram within last year in patients (regardless of age) with history of diabetes, hypertension, chest pain, congestive

heart failure, smoking, peripheral vascular disease, inability to exercise or morbid obesity.
- At time of preoperative evaluation, patient has any intercurrent cardiovascular symptoms, or signs and symptoms of new or unstable cardiac disease.

Cardiac arrhythmias and conduction disturbances are common findings in the perioperative period, and the electrocardiogram may be useful as a baseline study, although no controlled or randomized trials have been done to justify this widespread practice.

A perioperative electrocardiogram may be obtained to screen for abnormalities that require further evaluation or that will influence care under anesthesia. The consensus of the protocol work group is to recommend an electrocardiogram for all patients age 65 and over, within one year prior to procedure *[Low Quality Evidence]*. However, electrocardiograms are not indicated, regardless of age, for those patients having cataract surgery *[High Quality Evidence]*. Evidence suggests that preoperative electrocardiograms are not recommended for patients undergoing other minimal risk procedures *[High Quality Evidence]*.

1.22 *Hemoglobin*

Recommendation:

- The reason to obtain a preoperative hemoglobin should be based on the patient's underlying medical condition and the planned procedure (*Strong Recommendation, Low Quality Evidence*).

For example, patient has a history of anemia or history suggesting recent blood loss or anemia.

For example, bleeding and thrombotic complications in the perioperative period have been documented in patients with uncontrolled polycythemia; however, there is no evidence to quantitate the surgical and anesthetic risks of a patient with asymptomatic normovolemic anemia *[Low Quality Evidence]*. The optimal hemoglobin level (that provides a reserve for unexpected blood loss or cardiorespiratory stress) varies by patient and by type of procedure.

1.23 *Potassium*

- Patient is taking digoxin, diuretics, angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs).

1.24 *Chest X-Ray*

- Patient has signs or symptoms suggesting new or unstable cardiopulmonary disease.

1.25 *Pregnancy Test*

- Patient is of child-bearing age and
    a. Is sexually active and history suggests possible pregnancy (e.g., delayed menstruation)
    or

    b. Patient is concerned about possible pregnancy
    or

    c. The possibility of pregnancy is uncertain

2. Medical Conditions
2.1 Cardiovascular Disease

2.11 *Beta-Blockers*

Recommendations:

- All surgical patients should be assessed for cardiac risk factors (*Strong Recommendation, High Quality Evidence*).
- Beta-blocker therapy should be continued perioperatively in patients currently taking beta-blockers (*Strong Recommendation, High Quality Evidence*).
- Initiation of beta-blocker therapy should be considered for patients undergoing vascular surgery with high cardiac risk (coronary artery disease [CAD], positive stress test or presence of more than one clinical risk factor) (*Strong Recommendation, Low Quality Evidence*).
- Initiation of beta-blocker therapy should be considered in all patients undergoing intermediate-risk surgery with CAD or high cardiac risk (defined by the presence of more than one clinical risk factor) (*Strong Recommendation, Low Quality Evidence*).
- Beta-blocker therapy should be initiated one to two weeks prior to surgery if possible, and titrated to goal heart rate 60-80 beats per minute (bpm) (*Strong Recommendation, High Quality Evidence*).
- Beta-blockers should be continued postoperatively for at least 30 days (longer if beta-blocker therapy was taken prior to surgical

procedure) (*Strong Recommendation, High Quality Evidence*).

Beta adrenoceptor antagonists (beta-blockers) have been studied for their role in prevention of cardiac complications surrounding surgical procedures. These medications reduce heart rate and contractility, therefore increasing perfusion and decreasing oxygen demand. These effects may play a role in stabilizing vulnerable coronary plaques and reducing inflammation via decreased sympathetic tone *[Reference]*.

Current literature suggests that perioperative ischemia, risk of myocardial infarction, and death may be reduced by beta-blocker use in high-risk patients. There is evidence to strongly suggest starting beta-blockers days to weeks before elective surgery, although this has not been proven true. Goal heart rate should be titrated to a resting heart rate of 60-80 bpm in the absence of hypotension *[Low Quality Evidence]*.

For the remainder of patients undergoing non-cardiac surgery, the use of beta-blockers in the perioperative period remains controversial *[Low Quality Evidence]*, *[Reference]*.

The most recent American College of Cardiology/American Heart Association (ACC/AHA) Guidelines on Perioperative Cardiovascular Evaluation and Care for Non-Cardiac Surgery (released 2007) were updated in 2009. These guidelines provide the evidence base for the recommendations listed above.

1. Each patient should be evaluated for his/her Revised Cardiac Risk Index *[Reference]*.
    a. High-risk surgery (orthopedic, intraperitoneal, vascular, intrathoracic)? Yes____No___
    b. Ischemic heart disease? Yes____No___
    c. Cerebral vascular disease? Yes____No___
    d. Renal insufficiency (creatinine >2.0)? Yes____No___
    e. Diabetes mellitus? Yes____No___
    f. Congestive heart failure? Yes____No___

2.12 *Statin Therapy*

Recommendations:

- All surgical patients should undergo assessment of cardiac risk factors (*Strong Recommendation, Low Quality Evidence*).
- Statin therapy for patients currently taking statins should be continued perioperatively (*Strong Recommendation, Low Quality Evidence*).
- Initiation of perioperative statin therapy in patients undergoing vascular or intermediate risk procedures should be considered (*Strong Recommendation, Low Quality Evidence*).

Current ACC/AHA guidelines provide recommendations regarding perioperative statin use. Observational studies have shown statins to be potentially cardio-protective surrounding non-cardiac surgery.

Class I:

For patients currently taking statins and scheduled for non-cardiac surgery, statins should be continued.

Class IIa:

For patients undergoing vascular surgery with or without clinical risk factors, statin use is reasonable.

Class IIb:

For patients with at least one clinical risk factor who are undergoing intermediate-risk procedures, statins may be considered *[Low Quality Evidence]*.

2.13 *Anticoagulation and Blood Disorders*

Recommendation:

- If clinical circumstances suggest a potential bleeding problem, clinician should perform coagulation studies (*Strong Recommendation, Low Quality Evidence*).

Coagulation studies should be performed in patients with a known history of anticoagulation abnormalities, patients with recent history suggesting the potential for anticoagulation problems, patients who are currently taking anticoagulant therapy, and patients who may need postoperative anticoagulation (where a baseline may be needed).

2.131 Coronary Stents

Recommendations:

- Surgery should be avoided for at least four weeks after bare-metal stent implantation (*Strong Recommendation, Low Quality Evidence*).
- Surgery should be avoided for one year after drug-eluting stent implantation (*Strong Recommendation, Low Quality Evidence*).
- If surgery cannot be avoided during the above time periods, dual anti-platelet therapy should be continued perioperatively unless strongly contraindicated (i.e., procedures associated with high-risk for clinically significant bleeding, such as intracranial surgery) (*Strong Recommendation, Low Quality Evidence*).
- If deemed necessary to discontinue clopidogrel/prasugrel/ticlopidine preoperatively, aspirin should be continued, if at all possible, in the perioperative period in order to reduce cardiac risk (*Strong Recommendation, Low Quality Evidence*).

There is clear evidence that premature discontinuation of dual anti-platelet therapy (aspirin combined with clopidogrel, prasugrel or ticlopidine for any reason after coronary stent placement results in a marked increased risk of myocardial infarction or death *[Reference]*). Therefore, a critical part of the preoperative evaluation of a patient who fits this description is a careful assessment of the benefits of the surgery itself and surgical bleeding risk versus the high risk of cardiac events if platelet therapy is reduced or stopped prematurely. Important stent considerations include how long the coronary stent has been in place and whether the stent is a bare-metal stent versus a drug-eluting stent.

The pre-surgical evaluation of risk in this group of patients may require discussion with cardiology and surgery.

General principles are as follows:

- For patients with bare-metal stents, surgery should be avoided for at least four weeks after stenting.
- For patients with drug-eluting stents, surgery should be avoided for one year after stenting.
- If surgery cannot be avoided during the above time periods, dual anti-platelet therapy should be continued perioperatively unless strongly contraindicated such as intracranial surgery. Alternatives such as stopping the clopidogrel/prasugrel/ticlopidine and continuing aspirin or stopping all antiplatelet therapy may be necessary to reduce bleeding risk but are associated with increased cardiac risk.
- If anti-platelet therapy is held prior to surgery, it should be restarted as soon as possible following surgery (*Low Quality Evidence*).

2.132 Antithrombotic Therapy

General recommendations regarding antithrombotic therapy are beyond the scope of this document, given the different classes of medications and the variety of situations for which they are used. For patients on antithrombotic therapy, please refer to the ICSI guideline Antithrombotic therapy supplement (see the "Guideline Availability" field) for more detailed information regarding management.

2.133 Venous Thromboembolism Prophylaxis

Venous thromboembolism (VTE) is a common and potentially fatal perioperative complication. All surgical patients should undergo risk assessment for the development of VTE and have appropriate measures taken to prevent both clotting and bleeding in the perioperative period.

For more specific recommended prophylaxis based on surgery type, refer to the ICSI guideline Venous thromboembolism prophylaxis and ICSI guideline Antithrombotic therapy supplement (see the "Guideline Availability" field).

Refer to the Centers for Medicare and Medicaid Services (CMS) and the Joint Commission (JC) Surgical Care Improvement Project (SCIP) Care Measure VTE Prophylaxis guidelines at http://www.jointcommission.org.

2.2 Sleep Apnea

Recommendations:

- Clinicians should screen patients for sleep apnea or sleep apnea symptoms and communicate to surgical team (*Strong Recommendation, Low Quality Evidence*).
- Clinicians should remind patients who have been formally diagnosed with obstructive sleep apnea and have an oral appliance or continuous positive airway pressure equipment to bring their appliance or equipment with them on the operative day (*Strong Recommendation, Moderate Quality Evidence*).

Obstructive sleep apnea increases the patient's risk for intra- and postoperative complications *[Low Quality Evidence]*. Patients with a diagnosis of obstructive sleep apnea often have oral appliances or continuous positive airway pressure equipment and should be reminded to bring those appliances or equipment on the operative day, for use during the recovery from anesthesia or sedation.

Some patients may not have a diagnosis of obstructive sleep apnea confirmed by polysomnography studies but are presumed to have obstructive sleep apnea based on the preoperative history and physical examination. Quick and inexpensive surrogates for

polysomnography studies are not new and have several variants. Patients who score high on these indices may need to be treated in the perioperative period as though they have a formal diagnosis of obstructive sleep apnea. This information should be communicated to the surgeon and anesthesiologist before the patient undergoes any procedure involving general anesthesia, monitored anesthesia care, conscious sedation or the administration of narcotics (*Moderate Quality Evidence*, *High Quality Evidence*, *Low Quality Evidence)*.

2.3 Diabetes Mellitus

Recommendations:

- Individual patient evaluation and instruction should occur prior to surgery to avoid extremes in glucose levels (*Strong Recommendation, Low Quality Evidence*).
- Doses of long-acting insulins (glargine, neutral protamine Hagedorn [NPH], etc.) may be decreased by up to 50% preoperatively (*Strong Recommendation, Low Quality Evidence*).
- Oral diabetic agents and short-acting insulins should not be taken preoperatively (*Strong Recommendation, Low Quality Evidence*).
- Short-acting, sliding scale insulin should be used to treat high blood glucose values in patients holding their normal diabetic medications (*Strong Recommendation, Low Quality Evidence*).
- Glucagon-like peptide-1 (GLP-1) agonists (exenatide, liraglutide, pramlintide) should be held perioperatively (*Strong Recommendation, Low Quality Evidence*).
- Dipeptidyl peptidase-4 (DPP-4) inhibitors (sitagliptin) can be continued perioperatively, if patient desires (*Strong Recommendation, Low Quality Evidence*).

Given the complexities and wide variety of methodologies employed to achieve glycemic control, individual patient evaluation and instruction are required prior to surgery to avoid extremes in glucose levels.

Hypoglycemia can lead to harmful effects including cardiac rhythm problems and cognitive deficits. Hypoglycemia is difficult to detect in the sedated patient.

Hyperglycemia can lead to problems with electrolytes, acidosis and fluid balance and is associated with poor wound healing, increased risk of infection, as well as higher mortality in hospitalized patients.

The optimal glucose range needs further investigation.

General principles are as follows:

- Mild hyperglycemia is preferable to hypoglycemia.
- Patients should not take oral hypoglycemics on the day of the procedure.
- Patient should not take short-acting insulin bolus the morning of procedure.
- Long-acting or intermediate insulin may be used to cover basal insulin needs; 50% to 100% of usual dose is often reasonable.
- Insulin pumps should be continued but only to provide basal insulin coverage.
- The details of the insulin recommendations are influenced by the insulin sensitivity of the patient, the timing of the procedure, the length of the procedure, and how long the patient will need to take nothing by mouth following the procedure.

2.31 *Glycemic Control*

Recommendation:

- Glycemic control should be directed at achieving blood glucose levels between 140 and 180 mg/dL and not be directed at more intensive goal targets (80-110 mg/dL) (*Strong Recommendation, High Quality Evidence*).

Determination of a patient's glycemic control status is an important factor in preventing surgical site infection. In diabetics, outcomes are improved in patients with preoperative glycated hemoglobin (Hgb A1c) less than 7; however, there are no data on interventions that establish tight control *[Reference]*.

2.32 *Oral Hypoglycemic Therapy*

According to the American College of Endocrinology, oral hypoglycemic medications such as sulfonylureas and thiazolidinediones do not contribute to tight glycemic control and should be avoided in hospitalized patients unless they are eating a regular diet. Many of these medications do not directly affect serum glucose; instead, they increase insulin sensitivity. Metformin, specifically, is used with caution perioperatively due to the potential risk for development of postoperative lactic acidosis *[Reference]*.

2.33 *Newer Anti-Diabetic Medications*

GLP-1 agonists, such as exenatide, slow gastric motility. This effect could potentially delay gastrointestinal recovery after surgery. For this reason, these medications should be held perioperatively.

The DPP-4 inhibitors, such as sitagliptin, require glucose in order to exert their effects [*Reference*]. Hypoglycemia is unlikely if patients continue these medications around the time of surgery, however, if they are not taking anything by mouth, there is likely little reason to administer them.

2.4 Chronic Medication Use

The work group acknowledges there is very little evidence surrounding the management of chronic medications perioperatively. Decisions about medications to be administered or held around the time of surgery are driven by case reports, expert opinion and pharmacokinetic principles. A table has been developed for health care clinicians to help guide decisions about preoperative medication management (see Appendix D, "Drugs to Stop/Drugs to Continue," in the original guideline document).

It is extremely important to obtain a complete and accurate list of all of the patient's medications, both prescription, non-prescription, herbal tinctures, naturopathic and homeopathic remedies. Optimally, this would occur at least two weeks before surgery.

Given that medication management is driven largely by expert opinion, communication with the consulting anesthesiologist may be warranted if there are specific questions or concerns related to continuing or discontinuing medications.

2.41 *Drugs to Continue*

Recommendations:

- Clinicians should complete a thorough medication review (including all prescription, non-prescription and herbal or "natural" medicines) with the patient at least one week before surgery if at all possible (*Strong Recommendation, Low Quality Evidence*).
- Medications contributing to the patient's current state of medical homeostasis should be continued (i.e., neuro/psych medications, anti-arrhythmic agents, human immunodeficiency virus [HIV] medications, statins, anti-hypertensives) with the exception of the medication groups listed below under "Drugs to Stop" (*Strong Recommendation, Low Quality Evidence*).

In general, most prescription drugs can be continued up to the time of procedure and will not interfere with any anesthetic plan. The drugs to be continued should certainly include medications where discontinuation puts the patient at risk. Anti-Parkinson's drugs, anti-seizure medications, anti-hypertensives, statins, cardiac rhythm drugs, and all analgesics fall into this category. The possible exceptions to the above are the ACEIs and the ARBs, although cessation of these remains controversial (*Low Quality Evidence)*.

Factors for Consideration

Many of the drugs typically continued in order to sustain medical homeostasis in the patient are not continued without risk, especially considering potential drug interactions with anesthesia agents. See Section 2.4.1 in the original guideline document for factors to consider for specific drugs.

2.42 *Drugs to Stop*

Recommendations:

- Medications that do not contribute to the medical homeostasis of the patient should be discontinued in preparation for surgery (i.e., non-prescription medications, herbal or "natural" medicines and over-the-counter supplements) (*Weak Recommendation, Low Quality Evidence*).
- Medications that may increase risk of adverse outcomes perioperatively should generally be discontinued according to pharmacokinetic principles (i.e., non-steroidal anti-inflammatory drugs [NSAIDS], ACEI/ARB, diabetes medications, anticoagulants, osteoporosis agents, hormone therapy) (*Weak Recommendation, Low Quality Evidence*).
- Inadvertent administration of medications the night before or morning of surgery is not typically an indication for cancellation of surgical procedures (*Weak Recommendation, Low Quality Evidence*).

Those drugs with a potential to cause harm to the patient in the perioperative period should be discontinued. For example, NSAIDs and other anticoagulants increase bleed risk perioperatively. Some herbal supplements can prolong bleeding time, as well as increase blood pressure. The effects of many herbal supplements are unknown, as the actual composition of each product varies widely (these products are not regulated by the U.S. Food and Drug Administration). Hormone replacement therapies and some osteoporosis agents may promote clot development perioperatively. Optimal time frame for discontinuation before surgery depends on the pharmacokinetic profile of the medication, as well as individual patient factors. In general, it takes a drug approximately five half-lives to be completely eliminated from the system.

There is currently controversy surrounding the potential risk of bleeding associated with the use of omega-3 fatty acids. Based on the information provided by this summary, inadvertent administration of omega-3 fatty acids the night before or the day of surgery does not warrant cancellation of the scheduled procedure.

Diabetic medications and antithrombotics are dealt with elsewhere in this document. Non-prescription drugs, supplements and vitamins can be held the morning of surgery (*Low Quality Evidence)*.

2.5 Nicotine Cessation

Recommendation:

- Patients should be strongly encouraged always to quit nicotine use (*Strong Recommendation, Low Quality Evidence*).

This work group recognizes the confusion and concern related with regards to nicotine cessation shortly before surgery: misinterpretation of initial studies had suggested that smoking increased postoperative pulmonary complications *[Reference]*. However, the current literature, as well as this work group, consensus still agrees that patients should be strongly encouraged at all times to abstain from nicotine any time before surgery.

If patients are using nicotine replacement therapy, this should be continued perioperatively.

For certain procedures (e.g., vascular or orthopedic) the surgeon may require absolute nicotine cessation for at least three months prior to surgery, but that is beyond the scope of this document.

3. Antibiotic Management
Recommendations:

- Clinicians should assess patients for known drug allergies (*Strong Recommendation, Low Quality Evidence*).
- Clinicians should administer appropriate prophylactic antibiotic for procedure within one hour prior to surgical incision or two hours for vancomycin/fluoroquinolones when indicated (*Strong Recommendation, Low Quality Evidence*).
- Prophylactic antibiotic should be discontinued within 24 hours after surgery end-time for all non-cardiac procedures (*Strong Recommendation, Low Quality Evidence*).
- Prophylactic antibiotic should be discontinued within 48 hours after surgery end-time for all coronary artery bypass graft surgery (CABG)/cardiac procedures (*Strong Recommendation, Low Quality Evidence*).

3.1 Antibiotic Selection

Antibiotic choice is based on the activity against the normal flora associated with the surgical site and addressing specific patient factors such as methicillin-resistant staphylococcus aureus status *[Reference]*, *[Low Quality Evidence]*. See the Antibiotic Selection Table in Appendix E in the original guideline document for specific recommendations pertaining to antibiotic selection.

New guidelines released by the American Society of Health-System Pharmacists in collaboration with the Infectious Diseases Society of America suggest weight-based dosing of cefazolin, the most frequently utilized preoperative antibiotic. Typical dosages of cefazolin are 1 to 2 grams given intravenously (IV) within 60 minutes of incision. The guidelines now recommend doses up to 3 grams, depending on patient weight. See the Antibiotic Dosing Table in Appendix F in the original guideline document for specific dosing recommendations.

3.11 *Multi-Drug Resistant Organisms (MDRO)*

In order to control or eradicate multidrug-resistant organisms (such as methicillin-resistant *Staphylococcus aureus* [MRSA]), a number of interventions need to be utilized *[Reference]*.

- Identify patients with known MDRO (active carrier or history).
- Enforce adherence to infection control practices (hand hygiene, standard/contact precautions, isolation rooms, dedication of non-critical medical equipment).
- Utilize antimicrobial agents judiciously.

Coverage for MRSA with vancomycin should be considered for patients with known MRSA colonization or at high risk for MRSA colonization in the absence of surveillance data. As vancomycin is less effective than cefazolin in preventing infection caused by methicillin-sensitive *Staphylococcus aureus* (MSSA), institutions should consider the use of both agents preoperatively when desiring coverage for both MRSA and MSSA.

3.12 *Penicillin Allergy Management*

A number of articles have provided the following considerations regarding penicillin allergy management:

- Older data citing the cross-reactivity of penicillins with cephalosporins was 10% – this is an overestimate for a number of reasons. True risk is closer to 0.5%.
- Immunoglobulin E (IgE)-mediated reactions (angioedema, laryngeal edema, urticaria, anaphylaxis) are the only true allergic reactions, and the only ones that should be considered when making choices about antibiotic alternatives.
- Due to differences in ring structures of penicillins and cephalosporins, there should be minimal immunologic cross-reactivity between the compounds.
- Most second- or third-generation cephalosporins are unlikely to be associated with any cross reactivity with penicillins.
- For patients with a true, documented IgE-mediated allergic reaction to penicillin, avoid cephalosporins with similar side chains, or provide an alternate antibiotic (see Appendix C, "Antibiotic Selection Table," in the original guideline document).
- Skin testing may be of benefit, as 90% of patients who possess IgE antibodies to penicillins do tolerate cephalosporins with similar side chains – and up to 94% of patients will test negative for IgE antibodies, eliminating the worry of potential adverse reaction.

3.13 *Skin Testing*

The ability of penicillin skin testing to predict cephalosporin allergy is controversial. In order for penicillin skin testing to reliably predict corresponding cephalosporin allergy, the side chains must be similar. Skin testing does not necessarily predict a clinical reaction, as approximately 90% of patients who possess IgE antibodies to penicillin or amoxicillin do tolerate cephalosporins that contain similar or even identical side chains *[Reference]*.

3.14 *Vancomycin Allergy Management*

Vancomycin allergy is rare. Red-man syndrome, a pruritic, truncal redness, is caused by histamine release with rapid infusion rate. This reaction may be mislabeled as an allergy. Infusion times of 90 to 120 minutes at usual doses should prevent this reaction.

3.15 *"Clean" Procedures with Higher Infection Risk*

The work group acknowledges the controversy surrounding antimicrobial prophylaxis in breast surgery, herniorrhaphy and other "clean" surgical procedures. While infection rates are low in these procedures, some studies have shown a reduced risk of infection when prophylactic antibiotics are administered. The decision whether or not to administer prophylactic antibiotics in these procedures should be left to the discretion of the physician, after weighing the risk of inducing microbial resistance and the benefit of potentially reducing surgical site infections *[Reference]*.

3.2 Prevention of Endocarditis

3.21 *Patients with Cardiac Conditions*

Recommendation:

- Patients diagnosed with certain cardiac conditions and undergoing specified procedures should receive appropriate antibiotic prophylaxis (*Strong Recommendation, Low Quality Evidence*).

Cardiac conditions for which antibiotic prophylaxis is recommended:

- Prosthetic cardiac valve or prosthetic material used for cardiac valve repair
- Previous infective endocarditis
- Cardiac transplantation recipients who develop valvulopathy
- Congenital heart disease (CHD)
    - Unrepaired cyanotic CHD, including palliative shunts and conduits
    - Completely repaired congenital heart defect with prosthetic material or device, placed by surgery or by catheter intervention, during the first six months after the procedure
    - Repaired CHD with residual defects at site or adjacent to site of a prosthetic patch or prosthetic device

For patients with any of these conditions, prophylaxis is recommended only before:

- All dental procedures that involve manipulation of gingival tissue or of the periapical region of teeth, or perforation of oral mucosa
- An invasive procedure of the respiratory tract that involves incision or biopsy of respiratory tract mucosa, including tonsillectomy and adenoidectomy
- Any surgical procedures that involve infected skin or musculoskeletal structures

Refer to the original guideline document for antibiotic regimens.

3.3 Procedures in Patients with Previous Total Joint Replacement

Recommendation:

- Patients with prosthetic joints should not receive prophylaxis to prevent infected joint prosthesis (*Strong Recommendation, Low Quality Evidence*).

The latest guidelines released by the American Academy of Orthopaedic Surgeons - American Dental Association (AAOS-ADA) have altered their recommendations regarding antimicrobial prophylaxis in patients with artificial joints. This recommendation stems from dental procedures being unrelated to periprosthetic joint infections. No clear evidence exists showing that antibiotic prophylaxis reduces the risk for such infections *[Reference]*.

3.4 Colorectal Surgery

3.41 *Bowel Preparation*

3.411 Mechanical

The classic dogma requiring a mechanical bowel preparation has been challenged recently, with a number of studies failing to identify a decrease in contamination of the wound after mechanical bowel preparation.

3.412 Antibiotic

In the era of availability of modern single- and double-agent prophylactic therapy at the time of surgery, an oral antibiotic for bowel preparation the day prior to surgery is controversial and at the discretion of the surgeon *[Reference]*.

At the time of surgery, all patients should receive a dose of intravenous antibiotics with efficacy against colonic and skin flora.

3.5 Antibiotic Administration

3.51 *Preoperative*

Antibiotics should be administered so that the bactericidal concentration is present in the tissues at the time of incision. For most antibiotics, that concentration is reached 30 minutes after infusion. Vancomycin and fluoroquinolone infusion should be initiated within 120 minutes prior to incision due to a longer infusion time.

3.52 *Intraoperative*

Re-administration of antibiotics for surgical site infection prophylaxis is based on the antibiotic selected and the length of the surgical procedure. Newer guidelines are recommending only a single dose of intravenous antibiotics for procedures lasting less than four hours. In procedures lasting more than four hours or when major blood loss occurs, re-dosing should occur every one to two half-lives of the antibiotic (in patients with normal renal function) so that the bactericidal concentrations are maintained in the tissues while the incision remains open *[Low Quality Evidence]*, *[Reference]*.

Institutions may consider adding a reminder system or note on anesthesiology flow sheets close to the four-hour point of a surgery to prompt the question of whether to re-dose the antibiotic. This system may help ensure that patients in longer surgeries receive sufficient concentration of antibiotic, while still decreasing the risk of antimicrobial resistance *[Reference]*.

3.53 *Postoperative*

Current SCIP recommendations regarding length of postoperative antibiotic now specify continuing antibiotics up to 48 hours post-procedure for all CABG/cardiac surgical procedures. Prophylactic antibiotic therapy for all other surgical procedures should be discontinued at the discretion of the clinician.

4. Patient Education and Communication

The goal of the preoperative assessment is to identify and manage medical conditions that may impact perioperative morbidity and mortality. Preoperative assessment results must be communicated to the location where the procedure will be conducted prior to the date of the scheduled procedure. The report should include a comprehensive assessment, any adjunctive evaluation or specific recommendations.

When providing patient education, adequate attention to patients' reading level, potential visual impairments (provide large print materials) and other potential learning barriers is a critical component for preparing them for surgery.

See the original guideline document for more information on patient education.

4.1 Preoperative Showering/Shaving

For infection prevention purposes, patients should be advised to shower/bathe before arriving for their surgical procedure. They should be alerted not to shave or remove any hair at or near the surgical site. Each facility should establish specific guidelines for their patient population and the specific procedures being performed.

There is sufficient evidence to support that having patients cleanse the skin reduces the risk of infection.

4.2 Preoperative Fasting Recommendations (Nothing by Mouth)

Preoperative fasting guidelines have been revised and simplified over the last decade. The American Society of Anesthesiologists Task Force on Preoperative Fasting has issued practice guidelines that follow a "2, 4, 6, 8 hour" rule applying to all ages:

- The fasting period for clear liquids, including water, fruit juices without pulp, carbonated beverages, clear tea and coffee is recommended to be two hours or longer prior to surgery.
- The fasting period for breast milk is recommended to be four hours or longer prior to surgery.
- The fasting period for formula, non-human milk and light meals (such as toast) is recommended to be six hours or longer prior to surgery.
- The fasting period for fried and fatty foods or meat may be eight hours or longer, as these foods may prolong gastric emptying time. The amount and type of food should be taken into account to determine an appropriate fasting period.

Patients should be educated and informed of fasting requirements sufficiently in advance of the procedure *[Reference]*.

5. Patient, Procedure and Site Verification
   The verification process will be carried throughout the organization's entire pre-procedure processes from scheduling through the verification of the patient/procedure/side/site at the time of presentation of the patient for surgery. Documentation of the verification process will be performed in the appropriate medical record.

   5.1 Pre-Procedure Planning and Preparation (Equipment, etc.)

   Pre-procedure planning and preparation include those activities done at various times prior to the procedure to ensure preparedness for the patient and procedure. This includes the following:

   - The circulating and scrub nurse review the surgeon orders, equipment requests, preference cards and any other information that will contribute to the specific preparation required for the patient and procedure. Share essential planning at preop brief.
   - Preparation is carried out for special patient needs including positioning requirements, allergies, height, weight, etc.
   - Prepare the room, ensuring all is in working order including such items as operating/procedure room table, lights, tourniquet and microscope.
   - Limit the number of receptacles for discarded items, particularly for sponges.
   - Confirm that all needed instruments and implants are available and ready.
   - Confirm that all staff needed for the procedure are available and ready. This may include residents, hemodynamic staff or company representatives.

   5.2 Scheduling

   A verification process must exist at the point of scheduling. To eliminate mistakes, such as left/right translation errors, made while documenting a clinic visit to evaluate and plan a surgical procedure, the work group recommends that the surgical scheduling process require corroboration between the surgical consent, the order to schedule a procedure and an independent source document dictation (such as a radiology report or pathology report). The clinical professional's attention must be directed specifically to the organ/joint in question and laterality, as appropriate, before proceeding to the scheduling process. Independently verified documentation should be provided on paper, facsimile or electronic format, not by telephone or verbal communication. The only exception to this is during emergency situations. Ideally, the patient should also be provided the same information in hard copy form.

   Verification of consistency between the planned procedure, the consent and the radiology report or pathology report should occur when the patient arrives at the surgical facility, along with the rest of the preoperative verification process. A Hard Stop will occur during the verification process if a discrepancy is noted. The patient will not proceed through the perioperative process until the discrepancy has been resolved. The clinical professional will contact the attending surgeon for resolution of any discrepancies between the scheduled procedure, procedure order, consent, radiographic/pathology report or the final imaging review. The discrepancy must be reconciled at any point when such discrepancies are discovered.

6. Surgical Site Marking with Initials
   All personnel (e.g., preoperative nurse, circulating nurse, surgeon, and/or clinician designees, and anesthesia practitioner) involved in the

surgical procedure must take an active role in this process. If at any time a particular section of the protocol is not required (e.g., site marking), the other verifications and consent steps still apply.

6.1 Site Marking by Surgeon

- Before marking the surgical site with his/her initials, the surgeon will verify the patient's identity and the correct site of the surgical procedure:
    - Procedure and site identification information in the patient's informed consent
    - Information in the medical record
    - Diagnostic studies
    - Discussion with the patient/legal guardian

If there is a discrepancy regarding procedure and/or site in any of these information sources, the team will work together to resolve the discrepancy with relevant diagnostic sources before marking the site and proceeding with the case.

The initials indicating the surgical site will be written using an indelible surgical marker and will be visible when the patient is positioned and draped.

The work group recommends the use of an anatomical diagram when the surgeon's initials are not visible because of drapes or if it is not possible to mark the physical site.

Sensitive site marking – When there is a site sensitive area, mark the site on the correct operative side, directly above the site. Ensure that this marking is visible through drapes or use an anatomical diagram if it will not be visible.

For multiple sites/digits on the same anatomical site – The procedures should be numbered on the informed consent documentation and the sites marked with the appropriate corresponding number, along with the surgeon's initials.

For procedures involving laterality – The informed consent documentation will indicate the laterality and the site will be marked accordingly.

Laterality also applies to procedures that have a midline or orifice entry but the internal target location involves laterality. The laterality for procedures entered via midline or orifice entry will be indicated on the informed consent documentation and will be marked on an anatomical diagram. See the definition for Site in the original guideline document for more information.

Both sites will be marked for bilateral procedures.

For procedures involving level (spine or ribs) – The informed consent documentation will indicate the laterality and level, and the site will be marked in a way to indicate anterior or posterior, and general level (cervical, thoracic, lumbar, or rib number). Following incision, a radiopaque marker will be placed at the planned surgical site, and an intraop radiographic image will be taken to confirm the exact surgical site.

Teeth – mark the operative tooth (teeth) on the dental radiographs or dental diagram.

Premature infants for whom the mark may cause a permanent tattoo - all infants under the corrected gestational age of 38 weeks should not be marked. It is recommended that the surgical site be marked on an anatomical diagram.

Situations where marking the site would cause the patient harm (e.g., emergency procedures and unstable back fractures) – the site should not be marked and the rationale documented in the patient record.

Patient refusals – the surgical/procedural site should be marked on an anatomical diagram in the event a patient refuses a site marking.

See the original guideline document for information about exceptions to skin site marking, site marking in multiple procedure cases involving multiple surgeons, and the 2014 National Patient Safety Goal recommendations.

7. Regional Anesthesia Techniques and Verification Process
Any regional anesthetic technique must start with a pre-procedure evaluation of the patient by the anesthesia care provider. This includes obtaining informed consent from the patient, utilizing the same elements that compose informed consent for surgical anesthesia.

The elements of informed consent are *[Reference]*:

- The patient understands the diagnosis (if known), nature of the procedure and the indications for the proposed procedure.
- The patient understands potential short- and long-term risks and benefits of the proposed procedure.
- Reasonable alternatives have been discussed (regardless of their cost or the extent to which the treatment options are covered by

health insurance).
- The risks and benefits of alternative treatment, including the option of no treatment, and consequences of refusing treatment are understood.

Before the patient receives sedation, the anesthesia care provider will:

- Verify it is the correct patient, using two identifiers
- Mark the site of the planned regional technique if needed for laterality or level
- Confirm with the patient his/her understanding of the planned procedure

Immediately before performing the regional technique, the anesthesia care clinician will perform an Anesthesia Time-Out to verify with the entire team that it is the correct patient, the correct procedure and the correct location.

8. Patient Transported to Intraoperative Area Using Checklist (Reverify Patient Identification)
The transition of the patient from one location to another, whether or not the care clinicians change, creates the opportunity for errors to occur. Prior to moving the patient from the preoperative area to the operating/procedure room, the anesthesia care clinician or circulating nurse is responsible for final verification, including:

- Verifying consent is complete
- Verifying preoperative checklist has been completed by all required staff. Refer to the "Implementation Tools and Resource Table" in the original guideline document for additional information on pre-procedure verification checklist
- Verifying operative site is correctly marked (if applicable) by verifying the site marking against the patient's informed consent
- Notifying preoperative staff, verbally and/or electronically, that the patient is being moved to the operating/procedure room

Whenever possible, the patient should be an active participant in the verification process.

Immediately upon entry to the operating/procedure room:

1. The person who moved the patient to the room (anesthesia care clinicians and/or circulating nurse) will introduce the patient to those present in the operating room (e.g., scrub) and state the procedure to be performed. (This is done to ensure that the patient is in the correct operation procedure room.)
2. To ensure that the correct patient documents arrived in the operating room with the patient, the patient's name and date of birth (or medical record number) on the patient's ID band should be checked against the same patient information documented on the patient's informed consent and anesthesia care record.
3. If an electronic medical record (EMR) is used, the patient information on the informed consent will be checked against the EMR to ensure the correct EMR is open. This should be done before moving the patient to the operation/procedure room table.
4. Persons doing final verification should be at least two members of the operating team. Ideally, this would be the circulating nurse and the anesthesia care clinician. If possible, the patient should participate in the verification process.

9. Verify Site Marking/Position Patient/Skin Preparation/Clipping
9.1 Skin Preparation and Hair Removal

Most surgical site infections are from skin normal flora (coagulase-negative *Staphylococcus non-aureus*).

- The surgical site should be assessed before skin preparation. Skin should be assessed for the presence of moles, warts, rashes or other skin conditions. Inadvertent removal of lesions may provide an opportunity for wound colonization.
- The surgical site and surrounding areas should be clean.
- Antiseptics are shown to reduce bacteria on the skin, but a corresponding decrease in surgical site infection rates has not been demonstrated. The Centers for Disease Control's 1999 guidelines do recommend the use of antiseptics *[Reference]*. There is insufficient evidence from randomized trials to support the use of antiseptic preparation of the skin, or of one antiseptic over another *[Reference]*. Several antiseptic agents are available for preoperative preparation of skin at the incision site. Careful consideration should be given to the patient's condition. Some antiseptic agents may burn mucous membranes, and others are highly flammable. The prepared area must be large enough to extend the incisions or create drain sites. Some protocols recommend applying the antiseptic with sterile supplies, but again there is no literature to support this.
- Personnel should be knowledgeable in skin preparation techniques, including maintaining skin integrity and preventing injury to the skin *[Reference]*.
- Patient skin preparation should be documented in the patient record.
- Policies and procedures on skin prep should be reviewed regularly to assess new evidence.

See Appendix G, "Overview of Topical Antiseptics Used for Preoperative Skin Preparation," in the original guideline document.

Hair Removal

- The patient and procedure room should be assessed for amount and degree of hair removal.
- Refrain from hair removal unless the hair at or around the incision may interfere with the procedure *[Reference]*. Hair removal should be the exception, not the rule.
- Hair removal, when necessary, should occur as close as possible to the time of a surgical procedure and should be performed with clippers *[Reference]*. There is no evidence stating a specific time when to refrain from hair removal at or near the surgical site. Shaving more than 24 hours prior to the procedure is documented to increase infection risk *[Reference]*.

Definitions for Hair Removal Should Be Clarified

- The shaving method uses a sharp blade over the patient's skin to cut hair close to its surface. The razor is typically disposable. Shaving with a razor may result in cuts and abrasions to the skin and therefore should not be used.
- The clipping method uses clippers with fine teeth to cut hair close to the patient's skin. It leaves a short stubble of hair typically one millimeter in length. A clipper typically has a disposable head or is disinfected between patients. Staff should follow manufacturer's instructions provided with the hair clippers. Clippers do not come in contact with the patient's skin, thus decreasing cuts and abrasions.
- The use of depilatory creams is a method in which chemicals dissolve the hair. This is a slower process lasting anywhere from 5 to 20 minutes. Chemical depilatories may irritate the skin or result in an allergic reaction. A patch test is recommended 24 hours prior to cream applications.
- Consideration should be given to where hair removal occurs. Hair removal at the sterile field could potentially contaminate the surgical site and/or sterile fields due to loose hairs.

Refer to the original guideline document for more information on hair removal.

10. Prior to Incision – Active Verbal Time-Out

    The Time-Out is to be performed after the surgeon has scrubbed and gowned, and just prior to beginning the procedure. It is the final safety stop before the surgical procedure begins. The purpose of the Time-Out is to ensure that the correct patient, procedure to be performed, site of the procedure and patient positioning are all correctly verified.

    All the elements to be included in The Joint Commission (2014 National Patient Safety Goals) required Time-Out are consistent with the elements included in the briefing and Time Out within this protocol.

    The recommendation from this work group is to cover all those required elements, but to cover them in two distinct temporal steps. Also see Annotation #15.1, "Briefing," for the specific elements covered in the briefing.

    During the Time-Out, each person in the operating/procedure room must cease his/her activity and actively participate in the process. The team includes the surgeon, resident(s), student(s), anesthesia care clinician, scrub and circulator. No individual (e.g., student[s], vendor[s]) is exempt from stopping his/her activity during the Time-Out. If a member of the team refuses to actively participate in the Time-Out, the scalpel or cutting/incising device is not handed to the surgeon until that individual is replaced and the Time-Out completed.

    The Time-Out is to be initiated by the surgeon after he/she scrubs for the procedure. It should occur just prior to incision/procedure start. The scalpel or other cutting/incising device is not to be handed to the surgeon until the Time-Out has been completed.

    It is recommended that a visual memory aid be used to remind the surgeon to initiate the Time-Out. For example, a Time-Out sign or towel can be used to cover the scalpel or cutting/incising device. When one of these aids is used, it is important to hand it off the surgical field at the conclusion of the Time-Out so it is not retained in the patient.

    Each Time-Out must include the following standard elements:

    - Patient name
    - Procedure to be performed
    - Site of procedure (and level, if applicable) including visualization of the surgeon's initials (either on the patient's body or on an anatomical diagram), if applicable
    - Patient position

    See the original guideline document for more details on active verbal Time-Out and for 2014 National Patient Safety Goal recommendations.

11. Discrepancies

    If during the Time-Out, discrepancies among the consent, team members, imaging and/or equipment are discovered, the scalpel or cutting/incising device will not be handed to the surgeon until the discrepancy is resolved.

Institutions must develop a culture of safety. It is important that the organization and surgical services leadership team set the expectation that staff may, at any time, raise concerns or objections related to elements of the Time-Out if they believe discrepancies do or may exist. Demeaning, derogatory or retaliatory statements and/or actions taken against one or more individuals as a result of a concern raised during the Time-Out or any other part of the procedure are not to be tolerated. Each organization must have a process for immediate management when such behavior exists (The Joint Commission 2014 requirement).

12. Hard Stop
    If any part of the verification process was not followed and/or a discrepancy is discovered, the procedure is halted and will not continue until the missing steps of the verification process are completed and the discrepancies resolved.

    Resolution of discrepancies will include:

    - Reverification of patient identification
    - Review of the information in informed consent documentation
    - Review of the medical record
    - Review of diagnostic studies
    - Discussion with the patient/legal guardian (if appropriate)

    Conversations related to resolution of discrepancies will be held in a quiet location, away from activity/distractions. To consider a discrepancy resolved, confirmation of the correct procedure or surgical site and side must include all forms of documentation, as well as a discussion with the patient/legal guardian. After the discrepancy has been resolved, the procedure and site verification will be repeated.

    If the steps of the verification process cannot be completed or are not completed and/or any discrepancies cannot be resolved, the procedure is canceled and rescheduled.

13. Reverify/Pause if Internal Laterality/Implants/Spine Level
    If the procedure performed involves internal laterality, spine levels or the insertion of one or more implants, an intraoperative pause will be conducted. The pause will include the following elements (as appropriate):

    - Side or site involved (e.g., left ovary, right kidney)
    - Level to be entered (e.g., T4 left side) using images to validate location. Procedures involving level (spine) will have preoperative and intraoperative imaging present in the operating/procedure room. During the intraoperative period, the level will be identified using high-quality imaging and marked with opaque markers with specific bony landmarks. The surgeon will stop after the initial incision and confirm the target level of the procedure by comparing the preoperative and intraoperative imaging.
    - Implant to be inserted, specifically the:
        - Implant specification/type/expiration date
        - Size
        - Side or laterality

    The pause will include verbal confirmation by the surgeon, circulating nurse and scrub.

14. Safe Site Implementation
    - To facilitate implementation of the Hard Stop concept, have your chief executive officer communicate to all staff and physicians their support for the institution of the Hard Stop.
    - The Time-Out is best followed when a particular person/role has responsibility to call the Time-Out. The surgeon should then be the one to take the lead on initiating the Time-Out and have the circulator begin the review of information.
    - Establish pre-procedure and post-procedure communication standards in the form of structured hand-offs.
    - Develop a verification process at the point of scheduling. The work group recommends that this process include:
        - Corroboration between the surgical consent, the order to schedule a procedure and an independent source document dictation (such as a radiology report or pathology report).
        - Review of documents by a licensed independent practitioner or an RN, with attention directed specifically to the organ to be operated upon and laterality as appropriate before proceeding to the scheduling process.
        - The independently verified documentation provided on paper, fax or electronic format, not by telephone or verbal communication. The only exception to this is during emergency situations.

15. Communication
    15.1 Briefing

    It is expected that the initial plan for the surgical procedure will have been disseminated prior to the day of surgery, preferably at the time of

scheduling. The briefing is conducted to facilitate more effective and efficient case flow.

An effective briefing:

- Confirms patient and/or case needs and the plan for a particular procedure, including what will be needed and when it will be needed
- Includes the operating/procedure room team (surgeon, circulating nurse, anesthesia care clinician, scrub) who will be present during the procedure so they can react to the same information at the same time
- Should be conducted in the operating room before anesthesia induction but no later than final patient positioning
- Helps to ensure that all team members are prepared for potential problems or issues that might arise
- Helps cases to run more smoothly with less downtime

Appropriate briefing elements include:

- Team greeting or introduction of individual team members (if team members do not know each other) – recommended as mandatory
- Verification of implant(s), if the case will have implant(s) – recommended as mandatory
- Verification of image(s), if the case will have image(s) – recommended as mandatory
- Team is encouraged to comment or ask questions – recommended as mandatory
- Fire risk assessment and mitigation strategy

See the original guideline document for additional information on briefing elements.

15.2 Structured Hand-Off for Any Surgical Personnel Changes

During the perioperative period, care is serially assumed by various individuals. It remains extremely important to fully communicate patient-relevant information and pertinent problems each step of the way. A transfer of care occurs when one health care clinician transfers responsibility for the patient's care to another health care clinician. This occurs from pre-anesthesia to hospital discharge. Each care team is obligated to remain in close physical proximity to the patient as long as medically necessary until the receiving health care clinician has all the information needed to assume care. Dialogue between the health care clinicians must be verbal and face-to-face.

To increase efficiency and consistency in the exchange of information, it is recommended that a standard format be developed for giving "report" from one health care clinician to another. This includes, but is not limited to, patient name, procedure, medications given and to be given, pertinent problems, allergies, fluid status, cardiorespiratory status and laboratory values received or pending. The receiving health care clinician must be given the opportunity to ask questions and receive answers. It is STRONGLY recommended that this information be given verbally person to person, e.g., for transfer of the patient from the operating/procedure room or post-anesthesia care unit to the intensive care unit, physician-to-physician personal communication is optimal rather than information given through one or more intermediaries *[Reference]*.

15.3 Structured Hand-Off Process

A structured hand-off is a standardized method of communication to ensure a complete exchange of information occurs when the patient is transitioned from health care clinician to health care clinician whether or not that transition includes a geographic change. It is recommended that a safety checklist be used to note information needed to be handed off to the next caregiver.

The kind of information that should be provided during the transition includes the following:

- Patient name
- Type of procedure to be performed, being performed, or performed
- Critical test results
- Patient status
- Recent/anticipated changes in patient condition
- Plan of care/goals
- What to watch for in next interval of care

Repeat verification process if the patient has been moved or the care team changes at any point during preoperative care, intraoperative care or postoperative care areas.

16. Never Events

16.1 Retained Foreign Objects

The Joint Commission categorizes the unintended retention of a foreign body after surgery or other procedure as a sentinel event. Health care organizations are required to conduct a root cause analysis and to develop a corrective action plan designed to reduce the probability of a repeat occurrence.

As part of the Minnesota Adverse Health Event law, these events are reported directly to the state and are publicly disclosed. In the Minnesota Department of Health's Fifth Annual Public Report, covering periods October 7, 2007-October 6, 2008, 312 total adverse events, were reported, with 37 reported as unintentionally retained objects *[Reference]*.

The operating/procedure room survey is a safety check done to ensure that all items associated with a previous patient and procedure are removed from the operating suite or room. This is done after the patient has left the operating/procedure room.

The circulating nurse will be the designated person in charge of the survey. Other surgical team members including scrub personnel, anesthesia personnel, surgical assistants and housekeeping will be expected to assist in this process. The circulating nurse will be the final designee expected to do the final survey of the room prior to preparation for the next patient and procedure including the first procedure of the day.

See the original guideline document for details on what is included in the room survey.

Does Circulator Perform Room Survey Prior to Baseline Count?

If the circulator does not perform the room survey prior to the baseline count, then there is the potential for the baseline count to be compromised. In the event that the circulator does not perform the room survey prior to the baseline count, then all counts may be considered compromised and an image may be obtained at the close of the case.

16.11 *Baseline Count*

Perform Baseline Count Before Patient Arrives in the Operating/Procedure Room Suite

The counting recommendations outlined in this protocol are based on consensus statements and guidelines of American College of Obstetricians and Gynecologists and the American Academy of Pediatrics *[Reference]*.

In addition, articles on communication, teamwork, multitasking and interruptions and their relationship to unanticipated events were consulted *[Reference]*.

Accurately accounting for all items that could potentially become unintentionally retained is a priority of the entire surgical team, though the primary responsibility for performing the count process belongs to the circulator and scrub. There must be no distractions (e.g., extraneous conversation, music, unnecessary interruptions). The circulator must be a registered nurse *[Reference]*.

Radiographic imaging is not a substitute for performing accurate count procedures. Count procedures may be omitted or modified in an extreme patient emergency. This exception will be documented in the patient's medical record and when the patient's condition allows, radiographic imaging should be obtained to rule out the possibility of an unintentionally retained foreign object.

What Items Will Be Included in the Count Process

Best practice is the use of only radiopaque items in the surgical wound *[Reference]*. The work group recognizes that not every item that may be used during a surgical procedure is radiopaque.

It is the recommendation of the work group that radiopaque items should be used if that product is manufactured in a radiopaque form and all non-radiopaque items should be counted, regardless of whether that item is a required, countable item.

Sponges/soft goods – Sponges/soft goods will be counted for all procedures when they are used. Only radiopaque sponges/soft goods will be present within the surgical field *[Reference]*.

Laparotomy sponges or 4x8 sponges will not be cut into pieces or otherwise used for dressing *[Reference]*.

Non-radiopaque gauze used for dressing will be held in a separate area until the wound is closed *[Reference]*.

Sharps – Sharps will be counted for all procedures when they are used *[Reference]*.

An unintentionally retained micro needle is not reportable as a retained foreign object. Organizations will need to define a micro needle depending on their patient population (e.g., infants).

Miscellaneous items – Miscellaneous items will be counted for all procedures *[Reference]*.

Examples of a miscellaneous item include vessel clips, vessel loops, vascular inserts, cautery scratch pads, trocar sealing caps, catheter sheaths, non-radiopaque items such as hernia tapes and other small items.

Instruments – Instruments will be counted for all procedures when the possibility exists that an instrument could be unintentionally left behind *[Reference]*.

Organizations will need to define instruments that are at risk for being unintentionally retained. The work group has listed the following guiding principles to assist organizations in defining instruments to be counted:

- Size of the wound relative to the instruments being used
- Instruments that leave the hand of the operator after being placed in the operative field
- Instruments that are obscured within the wound and not clearly visible throughout the procedure (clips, guide wires, small clamps, etc.)

Instruments that are to be counted should be identified by specialty/service and specific to the procedure and surgical technique employed.

Examples of surgical procedures where instruments may be identified as a required countable item include chest, open abdominal, and pelvic procedures.

When the Count Process Will Be Performed *[Reference]*

- The baseline count will be performed before the patient is brought to the operating/procedure room unless parallel processing is used. When parallel processing is used, two different circulators will be needed: one dedicated to a focused count process and one dedicated to focused patient care.
- At the time of closure of a cavity within a cavity
- Before wound closure (e.g., fascia)
- At the end of the procedure/final closure (e.g., skin) – sponges/soft goods used for wound debridement procedures for burn patients are exempt from the final count process. A final count, as outlined in the protocol, must be performed for all other items (sharps, miscellaneous items, instruments) used in wound debridement procedures for burn patients.
- Any time a member of the surgical team has concerns about the accuracy of the counts, even when the counts appear correct.
- Whenever there is a permanent staff change of the circulator and/or scrub:
    - All visible items will be counted and all items in use in the surgical field will be accounted for.
    - When the circulator and/or scrub is changed for a short duration (e.g., lunch break), a structured hand-off is required but a count is not. The structured hand-off is performed for two purposes:
        1. To maintain the scrub's safety with sharps on the field
        2. To account for items in use in the field
- At final closure of a wound that was intentionally delayed (damage control), temporary implants are used, or a wound is temporarily closed with a non-radiopaque item (e.g., wound vacuum sponge)

How the Count Process Will Be Performed

- The circulator and scrub (the circulator must be a registered nurse) will directly view the items being counted and will count out loud and concurrently *[Reference]*.
- There is evidence that distractions, multitasking and conflicting priorities, especially during critical cognitive steps, will, with high predictability, lead to an error. It is recommended by the work group that the surgeon declare critical times, if known, during the briefing so the team can appropriately plan for breaks/reliefs. The surgical team is otherwise advised to use critical thinking skills to determine safe case interruption times *[Reference]*. Therefore, distractions and interruptions should be minimized during the count process *[Reference]*. If the count process is interrupted, the circulator and scrub will restart the count of the count category that was interrupted.
- The circulator will document the number and type of sponges/soft goods, sharps, miscellaneous items, and instruments on a preformatted white board or other standardized, preformatted documentation record. The scrub verbally confirms the number.
- All sponges/soft goods, sharps, miscellaneous items, and instruments will be counted in the same order each time.
- Sponges/soft goods will be separated and counted individually *[Reference]*.

See the original guideline document for more information on how the count process will be performed, recommendations for waiving baseline count with life-threatening cases, and communication of unresolved counts in operating/procedure room.

16.12 *For Appropriate Cases, Do Wound or Body Cavity Exploration and Imaging if Counts Not Reconciled: Postoperative Follow-Up if Counts Remain Unreconciled*

Radiographic imaging, whether a portable radiographic image obtained in the operating/procedure room or a postoperative image obtained in a radiographic room, is not a substitute for performing an accurate count process and methodical wound exploration.

An intraoperative radiographic image can be used to exclude the possibility of a retained foreign object. Portable radiographic imaging has

limitations that should be considered, especially for visualizing micro needles. In addition, the type of imaging equipment (e.g., C-arm) used and cassette orientation relative to the surgical site should be considered.

The highest quality radiographic imaging is obtained in a radiographic room with fixed radiographic equipment and moving grid. If there are still unreconciled counts, it is recommended that the surgeon have a discussion with the patient and make a follow-up plan. The plan could include additional imaging (x-ray, computed tomography, magnetic resonance imaging).

Portable imaging considerations and limitations:

- Patient condition
- Size and type of retained item (non-radiopaque items, micro needles)
- Limited placement options of the radiographic film cassettes under operating/procedure room tables limiting anatomy included on the images
- Lower tube power
- Instruments obscuring the image area
- Availability of portable radiographic equipment and staff

Portable intraoperative imaging should be obtained when:

- Counts are off and cannot be reconciled
- The patient's condition did not allow for the count process to be followed (rushed counts, incomplete counts)
- Any individual has a concern about the accuracy of the counts
- Before final closure when the wound was previously intentionally left open/packed

Imaging requests to rule out a possible retained foreign object need to include the following information:

- Callback number and surgeon's name
- Location and status of patient (e.g., in operating/procedure room with wound closure suspended, in post-anesthesia care unit)
- Type of surgery
- Type of item missing
- Details of the surgery as appropriate

The radiology technologist will review the radiographic images for quality and repeat the imaging as necessary.

Prior to the radiographic images being interpreted by radiology, the surgeon will review the radiographic images for adequate anatomic coverage related to the procedure and operative site. If the surgeon is unable to verify adequate anatomic coverage on the portable intraoperative images, postoperative radiographic imaging with fixed radiographic equipment should be obtained.

The work group recommends that the radiologist and surgeon simultaneously review the radiographic images both verbally and visually to correlate the anatomical coverage of the images with the surgical procedure, as well as a description of the potentially retained foreign object.

If a radiologist is not immediately available, the preliminary interpretation of the radiographic images to exclude a potentially retained foreign object is the responsibility of the surgeon.

Postoperative radiographic imaging in a radiographic room with fixed radiographic equipment and moving grid should be obtained as soon as possible when there is a discrepancy in the counts and:

- The patient's condition did not allow for intraoperative imaging to be obtained
- The entire anatomic area was not included in the portable intraoperative imaging
- The intraoperative imaging failed to locate the retained foreign object and the counts could not be reconciled

Prior to the radiographic images being interpreted by radiology, the surgeon will review the radiographic images for adequate anatomic coverage related to the procedure and operative site. The radiology technologist will review the radiographic images for quality and repeat the imaging as necessary *[Reference]*.

Body Cavity Entered/Created

A methodical wound exploration will be performed prior to the closure of the wound and/or any body cavity. It is possible that the surgeon may perform multiple wound/body cavity explorations during the procedure (e.g., the stomach and abdominal cavities) *[Reference]*.

Whenever possible, the surgeon will use both visualization and touch during the cavity exploration. Generally, the type of surgical procedure performed guides the wound exploration technique employed. It is recommended that the wound exploration be methodical and performed

by each physician the same way each time (e.g., top to bottom, quadrant to quadrant) *[Reference]*.

A methodical wound exploration may be omitted or abbreviated in an extreme patient emergency or if the patient becomes clinically unstable. Ideally, the method used to perform the wound exploration will be documented by the surgeon as part of the operative note.

The cavity exploration may be performed simultaneously with the counting by the scrub and circulator. The cavity will not be closed until counts have been reconciled. If the counts cannot be reconciled even after a thorough exploration of the cavity and the cavity is expected to be closed at the end of the procedure, an intraoperative film must be obtained prior to the cavity closure.

16.13 *Perform Delayed Wound Closure/Open Packing, Final Count and Retained Foreign Object Prevention Process*

Certain circumstances require that a wound be left open following a surgical procedure with the intent that the patient will return to the operating/procedure room at a later time for final wound closure. Examples of these cases include grossly contaminated wounds (Class III and IV wounds) or when the patient is unstable or has the potential to develop instability (e.g., damage control procedure).

When the closure of a wound is intentionally delayed (damage control) or when implants are used as part of the treatment (e.g., antibiotic beads, wound-vacuum sponges), the following will be performed:

- Radiopaque items will be used if that product is manufactured in a radiopaque form *[Reference]*.
- Count the items and document the item categories and numbers in the procedure record.
- Any sponges/soft goods packed in the operating/procedure room and removed must be counted and documented in the patient's medical record.
- Any sponge/soft goods packed into or left on the wound must be counted and documented in the patient's medical record.

16.14 *Patient Returns to the Operating/Procedure Room for Final Wound Closure*

- Establish a baseline count of sponges/soft goods, sharps and instruments that will be used in the final wound closure and document them on a preformatted whiteboard (or on a preformatted count worksheet if a preformatted whiteboard is not available).
- When the patient returns to the operating/procedure room for final wound closure, sponges/soft goods removed from the open wound should be isolated from sponges/soft goods used during the final wound closure.
- Count packed items as they are removed from the wound, and reconcile the items and number of items with what was previously documented in the patient's medical record.
- When there is a discrepancy between what was removed and what was documented as left in the wound, an attempt to reconcile the discrepancy will be performed as described in Annotation #16.15, "Hard Stop – Perform Reconciliation Process."
- A thorough wound exploration will be performed prior to closing the wound and documented in the patient's record.
- Count the sponges/soft goods, sharps and instruments that were used in the final wound closure procedure, and reconcile the count with what is documented on the preformatted whiteboard (or on a preformatted count worksheet if a preformatted whiteboard is not available).
- When there is a discrepancy between the baseline count and the final count record, an attempt to reconcile the discrepancy is performed as described in Annotation #16.15, "Hard Stop – Perform Reconciliation Process."
- An intraoperative radiographic image should be obtained prior to final wound closure to ensure all items have been removed.

16.15 *Hard Stop – Perform Reconciliation Process*

Process for Managing Count Discrepancies

When a discrepancy in countable items is identified, the missing item and number are reported to the surgical team by the circulator. A discussion (involving the surgeon, circulator nurse and scrub) will occur during which the circulator will communicate to the surgeon the type(s) and number(s) of missing foreign objects. If the patient's condition permits, wound closure should be suspended during the discussion regarding the missing foreign object. If wound closure has begun it will not continue until the discussion occurs. This is a Hard Stop.

The work group recommends that the circulating nurse organize used countable items in such a way that counts (e.g., closing a cavity within a cavity, initial closing count, final count) performed after the baseline count can be performed effectively and efficiently. Sponge count bags and numbered needle boards are tools that will help to organize items for counting.

If a closing count is incorrect, the following steps will be taken to reconcile the count if the patient's condition permits.

1. The surgeon must be notified immediately. A discussion will occur, during which the circulator will communicate to the surgeon the type(s) and number(s) of missing items. This is a Hard Stop.
2. The circulating nurse will summon additional personnel to the operating/procedure room to assist with resolving the count.

3. The surgeon will re-explore the wound, paying special attention to the location where that particular item may be retained (e.g., sponges tucked behind organs).
4. The count is repeated and verified. A discrepancy with the count will never be resolved by using the number listed on opened packages.
5. Surgical closure may continue at the surgeon's discretion, but final skin closure cannot occur until all x-ray results are reviewed and communicated back to the surgeon by the radiologist.
6. If the item is still missing after the recount and wound exploration, the scrub team must search the drapes, field, Mayo stand and back table. At the same time, the circulating nurse must search the sponge count bag, trash, linen, floor, kick bucket(s) and all items that have been counted off the field. Sponges/soft goods will be unballed and separated for counting.
7. If the item is located in this search, a complete recount *must* be conducted and the correct count documented.
8. If counts cannot be reconciled by team members, and the missing item is radiopaque, notify the attending surgeon and obtain an x-ray order to "rule out retained foreign object."

If the counts cannot be reconciled, all the measures taken and the outcomes of those steps should be documented per the organization's policy. A radiographic image obtained in a radiology room with fixed equipment and moving grid should be obtained.

Note: The Minnesota Adverse Event Reporting law requires the reporting of a retained foreign object. The above reconciliation steps give consideration to the current definition of a reportable event and are intended to avoid such an adverse event. The work group will continue to review for evidence supporting best practice.

Policy Exception

An exception may occur when the attending surgeon decides that any delay required for an intraoperative x-ray or removal of the foreign object(s) will cause harm to the patient due to his or her emergent medical condition.

16.16 *Imaging if Counts Not Reconciled: Postoperative Follow-Up if Counts Remain Unreconciled*

See Annotation 16.12 above and the original guideline document.

16.17 *Close Wound*

Close Wound and Finish Procedure

A radiographic image prior to closure of the wound does not need to be obtained when count processes are rigorously followed and all counts can be reconciled.

Post-Procedure Tasks

- Any countable item that accompanies the patient out of the operating/procedure room will be communicated to the circulator and documented *[Reference]*.
- After the counts have been reconciled, all items will be removed from the operating/procedure room. No items will be removed from the operating/procedure room until all counts have been reconciled and inspections completed.
- The whiteboard will be cleaned at the end of the procedure and before setup begins for the next procedure.
    - Note: The date, time, type and number of any unaccounted for item will be recorded on the whiteboard and communicated to each subsequent surgical team until the operating/procedure room is terminally cleaned.

17. Environmental
    17.1 Normothermia Planning and Management

Temperature Control

Development of hypothermia in the patient has been shown to be associated with increased risk of infection. Prevention of hypothermia begins prior to patient arrival in the room. The room temperature should be such that a minimally clothed patient is comfortable. It is appropriate to adjust room temperature to a level comfortable for the operating/procedure room personnel once the patient has received active or passive measures to prevent heat loss.

Recommendations:

Temperature should be monitored in all patients receiving anesthesia when significant changes in body temperature are intended, anticipated or suspected *[Reference]*. Many means to monitor temperature exist, with varying levels of accuracy and ease of use. These include oral, tympanic membrane, esophageal, axillary, skin, bladder, rectal, trachea, nasopharynx, and pulmonary artery catheters. The choice of the site

depends on access, type of surgery and accuracy.

See the original guideline document for more information on temperature control and other considerations.

17.2 Preventing Fires in the Operating Room (OR)/Procedure Room

Recommendations:

- Each organization should have an OR fire prevention policy structured to fit the physical environment of the OR suites (*Strong Recommendation, Low Quality Evidence*).
- The policy should be reviewed each year after the fire drill practice and updated with any needed changes (*Strong Recommendation, Low Quality Evidence*).
- Each organization should have a comprehensive fire drill at least once a year. This should include different fire scenarios each year (*Strong Recommendation, Low Quality Evidence*).
- All members of the perioperative team and support services in the surgical environments should participate in the drill (*Strong Recommendation, Low Quality Evidence*).
- Local fire department members and organizational life safety representation should participate in the fire drill (*Strong Recommendation, Low Quality Evidence*).

All department staff and clinicians are accountable for participation in department fire safety training.

OR fire drills will be performed periodically.

A permanently mounted air-oxygen blender or alternative device or equipment will be available to titrate the oxygen concentration.

All ORs and interventional areas will have CO_2 fire extinguishers for fires near or on the patient.

The fire alarm will be activated for any fire in order to notify the fire department.

A fire risk assessment will occur for all surgical procedures and communicated during briefings and/or time-outs. The fire risk assessment will be documented on the whiteboard and in the electronic health record (EHR).

17.3 General Environmental Concerns
Each facility should establish an effective method of infection event surveillance that includes data collection, review and considerations for process improvement.

Preoperative Preparation for Colon Surgery

As a result of pivotal trials performed in the 1970s, surgeons of the last generation incorporated routine mechanical and oral antibiotic bowel preparations into the practice of surgery on the colon. However, a number of recent trials in the modern era suggest that these two mainstays of preparation may not be necessary.

Recommendations for Surgical Staff

Hand Hygiene

Current hand hygiene recommendations should be met.

See the original guideline document for recommendations for management of surgical personnel.

Recommendations for Operating/Procedure Room Environmental Controls

Operating/procedure room environmental controls are mandated and regulated by each state's department of health. For specific recommendations from the Minnesota Department of Health, see: http://www.health.state.mn.us/ .

Management of Operating/Procedure Room Surfaces

Health care workers should assume that any patient could be potentially infectious with blood borne or other pathogens. Infection control practices should be followed at all times. Environmental cleaning and disinfection is a team effort involving surgical and environmental services personnel. Recommended practices from these specialty areas should be implemented.

Sterilization of Operating/Procedure Room Devices

Inadequate sterilization of surgical instruments has resulted in surgical infections, and routine monitoring of the quality of the sterilization process is recommended. Surgical instruments should be sterilized according to the manufacturer's recommendations.

See the original guideline document for more details on sterilization of operating/procedure room devices.

17.4 Environmental Controls: Operating/Procedure Room Survey

Recommendations for Operating/Procedure Room Environmental Controls

There must be no distractions (e.g., extraneous conversation, music, unnecessary interruptions) and when the circulator and/or scrub is changed for a short duration (e.g., lunch break), a structured hand-off is required but a count is not. Operating/procedure room environmental controls are mandated and regulated by each state's department of health. For specific recommendations from the Minnesota Department of Health, see http://www.health.state.mn.us/ .

Noise Control to Minimize Distraction and Patient Stimuli

There must be no distractions (e.g., extraneous conversation, music, unnecessary interruptions). Adjust music volume to level that is appropriate to work being performed. The music should not interfere with communication among members of the operating/procedure room team.

See the original guideline document for recommendations for operating/procedure room vendor access.

18. Follow-Up Appointments
    Patients should be encouraged to schedule and keep all follow-up appointments with their surgeon and primary clinician. Follow-up appointments provide the opportunity for the surgeon and primary clinician to assess the patient for signs and symptoms of infection related to the surgical procedure and intervene or modify the care plan as appropriate *[Reference]*.

Definitions:

Quality of Evidence and Strength of Recommendations

Category	Quality Definitions	Strong Recommendation	Weak Recommendation
High Quality Evidence	Further research is very unlikely to change confidence in the estimate of effect.	The work group is confident that the desirable effects of adhering to this recommendation outweigh the undesirable effects. This is a strong recommendation for or against. This applies to most patients.	The work group recognizes that the evidence, though of high quality, shows a balance between estimates of harms and benefits. The best action will depend on local circumstances, patient values or preferences.
Moderate Quality Evidence	Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate.	The work group is confident that the benefits outweigh the risks, but recognizes that the evidence has limitations. Further evidence may impact this recommendation. This is a recommendation that likely applies to most patients.	The work group recognizes that there is a balance between harms and benefit, based on moderate quality evidence, or that there is uncertainty about the estimates of the harms and benefits of the proposed intervention that may be affected by new evidence. Alternative approaches will likely be better for some patients under some circumstances.
Low Quality Evidence	Further research is very likely to have an important impact on confidence in the estimate of effect and is likely to change. The estimate or any estimate of effect is very uncertain.	The work group feels that the evidence consistently indicates the benefit of this action outweighs the harms. This recommendation might change when higher quality evidence becomes available.	The work group recognizes that there is significant uncertainty about the best estimates of benefits and harms.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Any disease or condition requiring a surgical procedure performed in the operating/procedure room with risk of:

- Surgical site infection
- Unintentional retention of a foreign object
- Hypothermia
- Environmental mishaps

Guideline Category

Evaluation

Management

Prevention

Risk Assessment

Clinical Specialty

Anesthesiology

Cardiology

Colon and Rectal Surgery

Infectious Diseases

Internal Medicine

Neurological Surgery

Nursing

Obstetrics and Gynecology

Pediatrics

Preventive Medicine

Radiology

Surgery

Thoracic Surgery

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Health Care Providers

Health Plans

Hospitals

Managed Care Organizations

Nurses

Pharmacists

Physician Assistants

Physicians

Guideline Objective(s)

- To increase the percentage of patients age two years and older with complete preoperative history and physical examination obtained prior to undergoing elective, non-high-risk surgery and no diagnostic tests performed without clinical indications
- To increase the percentage of patients age two years and older undergoing elective, non-high-risk surgery who receive appropriate management of stable comorbidities prior to procedure
- To decrease the percentage of patients age two years and older who have canceled or delayed elective, non-high-risk surgical procedures due to incomplete preoperative basic health assessment and ineffective communication between clinicians
- To eliminate the wrong surgical procedure or surgery performed on the wrong body part or on the wrong patient
- To eliminate unintentionally retained foreign objects during a surgical procedure
- To minimize the rate of infections in surgical patients
- To improve the adherence to the key components of the Perioperative protocol

Target Population

Adult and pediatric patients undergoing an operative procedure

Notes:

Pediatric patients for whom this protocol is intended are those between the ages of 2 and 15 years. Patients over age 15 are considered adults for the purposes of this protocol.
Emergent and urgent procedures are outside the scope of this protocol, but the topics of this protocol may still apply.

Interventions and Practices Considered

1. Preoperative basic health assessment
2. Treatment of medical conditions in the intraoperative period (cardiovascular disease, sleep apnea, diabetes mellitus, chronic medication use, nicotine cessation)
3. Antibiotic management
4. Patient education and communication
5. Patient, procedure and site verification
6. Surgical site marking with initials
7. Regional anesthesia techniques and verification process
8. Patient transportation to intraoperative area using checklist
9. Verification of site marking
10. Patient positioning
11. Skin preparation, including hair removal
12. Active verbal time-out prior to incision
13. Resolution of discrepancies during time-out
14. Reverification if necessary
15. Safe site implementation
16. Communication in the surgical area
17. Prevention of never events (e.g., retained foreign objects)

18. Environmental controls
19. Follow-up appointments

Major Outcomes Considered

- Alternative management strategies
- Surgical site infection
- Morbidity and mortality due to surgery

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

A literature search of clinical trials, meta-analyses, and systematic reviews is performed. The literature search terms for the current revision of this document include smoking as a risk factor for surgical site infection (SSI), malnutrition as a risk factor for SSI, nicotine and wound healing. Literature search terms used for this revision include literature in PubMed from 2011 through 2013.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Quality of Evidence and Strength of Recommendations

Category	Quality Definitions	Strong Recommendation	Weak Recommendation
High Quality Evidence	Further research is very unlikely to change confidence in the estimate of effect.	The work group is confident that the desirable effects of adhering to this recommendation outweigh the undesirable effects. This is a strong recommendation for or against. This applies to most patients.	The work group recognizes that the evidence, though of high quality, shows a balance between estimates of harms and benefits. The best action will depend on local circumstances, patient values or preferences.
Moderate Quality Evidence	Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate.	The work group is confident that the benefits outweigh the risks, but recognizes that the evidence has limitations. Further evidence may impact this recommendation. This is a recommendation that likely applies to most patients.	The work group recognizes that there is a balance between harms and benefit, based on moderate quality evidence, or that there is uncertainty about the estimates of the harms and benefits of the proposed intervention that may be affected by new evidence. Alternative approaches will likely be better for some patients under some circumstances.
Low Quality Evidence	Further research is very likely to have an important impact on confidence in the	The work group feels that the evidence consistently indicates the benefit of this action outweighs the	The work group recognizes that there is significant uncertainty about the best estimates of benefits and harms.

Category	Quality Definitions	Strong Recommendation	Weak Recommendation
	estimate of effect and is likely to change. The estimate or any estimate of effect is very uncertain.	harms. This recommendation might change when higher quality evidence becomes available.	

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Document Development

A work group consisting of 6 to 12 members that includes physicians, nurses, pharmacists, other healthcare professionals relevant to the topic, and an Institute for Clinical Systems Improvement (ICSI) staff facilitator develops each document. Ordinarily, one of the physicians will be the leader. Most work group members are recruited from ICSI member organizations, but if there is expertise not represented by ICSI members, 1 or 2 members may be recruited from medical groups, hospitals, or other organizations that are not members of ICSI. Patients on occasion are invited to serve on work groups.

The work group will meet for 3 to 4 three-hour meetings to develop the protocol. Under the coordination of the ICSI staff facilitator, the work group develops the algorithm and writes the annotations, citing literature where appropriate.

Once the final draft copy of the protocol is developed, the document is sent to the ICSI members for review and comment.

Rating Scheme for the Strength of the Recommendations

See the "Rating Scheme for the Strength of the Evidence" field.

Cost Analysis

One study states that "history-taking and the physical examination are still the best means of preoperative screening, and laboratory tests other than those indicated by the history and physical examination are not cost effective, do not provide medicolegal protection, and in fact may harm the patient."

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

Review and Comment

The purpose of the review and comment process is to provide an opportunity for the clinicians in the member organizations to review the science behind the recommendations and focus on the content of the protocol. Review and comment also provides an opportunity for clinicians in each organization to come to consensus on feedback they wish to give the work group and to consider changes necessary across systems in their organization to implement the protocol.

All member organizations are encouraged to provide feedback on protocols; however, responding to review and comment is not a criterion for continued membership within the Institute for Clinical Systems Improvement (ICSI).

Document Approval

Each document is approved by the appropriate steering committee. There is a steering committee for Respiratory, Cardiovascular, Women's Health, and Preventive Services. The Committee for Evidence-based Practice approves guidelines, order sets, and protocols not associated with a particular category. The steering committees review and approve each protocol based on:

- Member comments have been addressed reasonably.
- There is sufficient reason to expect that members will use the protocol with minor modifications or adaptations.
- Within the knowledge of the reviewer, the recommendations in the protocol are consistent with other protocols, regulatory and safety requirements, or recognized authorities.
- When evidence for a particular step in the protocol has not been established, the work group identifies consensus statements that were developed based on community standard of practice and work group expert opinion.
- Either a review and comment by members has been carried out, or within the knowledge of the reviewer, the changes proposed are sufficiently familiar and sufficiently agreed upon by the users that a new round of review is not needed.

Once the document has been approved, it is posted on the ICSI Web site and released to members for use.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for selected recommendations (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Reduced perioperative morbidity and mortality
- Appropriate perioperative management of patients

Potential Harms

- Some antiseptic agents may burn mucous membranes, and others are highly flammable. See Appendix G, "Overview of Topical Antiseptics Used for Preoperative Skin Preparation," in the original guideline document for more information on antiseptic toxicity.
- Many oral hyperglycemic agents do not directly affect serum glucose; instead, they increase insulin sensitivity. Metformin, specifically, is used with caution perioperatively due to the potential risk for development of postoperative lactic acidosis.
- Glucagon-like peptide (GLP)-1 agonists, such as exenatide, slow gastric motility. This effect could potentially delay gastrointestinal recovery after surgery. For this reason, these medications should be held perioperatively.

Contraindications

Contraindications

- Continuation of dual anti-platelet therapy is strongly contraindicated in procedures associated with high risk for clinically significant bleeding, such as intracranial surgery.
- For patients with a true, documented immunoglobulin E (IgE)-mediated allergic reaction to penicillin, avoid cephalosporins with similar side chains, or provide an alternate antibiotic (see Appendix C, "Antibiotic Selection Table", in the original guideline document).

Qualifying Statements

Qualifying Statements

- The information contained in this Institute for Clinical Systems Improvement (ICSI) Health Care Protocol is intended primarily for health professionals and other expert audiences.
- This ICSI Health Care Protocol should not be construed as medical advice or medical opinion related to any specific facts or circumstances. Patients and families are urged to consult a health care professional regarding their own situation and any specific medical questions they may have. In addition, they should seek assistance from a health care professional in interpreting this ICSI Health Care Protocol and applying it in their individual case.
- This ICSI Health Care Protocol is designed to assist clinicians by providing an analytical framework for the evaluation and treatment of patients, and is not intended either to replace a clinician's judgment or to establish a protocol for all patients with a particular condition.

Implementation of the Guideline

Description of Implementation Strategy

Once a guideline is approved for release, a member group can choose to concentrate on the implementation of that guideline. When four or more groups choose the same guideline to implement and they wish to collaborate with others, they may form an action group.

In the action group, each medical group sets specific goals they plan to achieve in improving patient care based on the particular guideline(s). Each medical group shares its experiences and supporting measurement results within the action group. This sharing facilitates a collaborative learning environment. Action group learnings are also documented and shared with interested medical groups within the collaborative.

Currently, action groups may focus on one guideline or a set of guidelines such as hypertension, lipid treatment, and tobacco cessation.

Detailed measurement strategies are presented in the original guideline document to help close the gap between clinical practice and the guideline recommendations. Summaries of the measures are provided in the National Quality Measures Clearinghouse (NQMC).

Implementation Recommendations

Prior to implementation, it is important to consider current organizational infrastructure that address the following:

- System and process design
- Training and education
- Culture and the need to shift values, beliefs and behaviors of the organization
- Develop a reliable, standardized system to obtain complete preoperative basic health assessments and appropriate preoperative testing to eliminate unwarranted variation. (See Appendix B, "Preoperative Questionnaire – Adult" and Appendix C, "Preoperative Questionnaire – Pediatric," in the original guideline document.)
- Establish a reliable mechanism to communicate completed preoperative basic health assessments, associated test results, and instructions to procedure location and patient prior to procedure. (See Appendix A, "Patient Preoperative Guide," in the original guideline document.)
- Develop a comprehensive patient-centered approach to education and appropriate procedure preparation.

System Implementation

- The facility is encouraged to customize the protocol with a key that identifies the individuals responsible for completing the algorithm tasks (e.g., green shapes for those individuals responsible for counts).
- Leadership support and a surgeon champion are absolutely essential for the successful implementation of this protocol.

- Develop a procedural checklist to document completion of each step and ensure that all elements of the protocol are completed.
- Direct observations, along with coaching and immediate feedback, are effective strategies in gaining staff adherence to the protocol following implementation. Additionally, the use of crucial conversation tactics can be effective for staff.
- As it relates to this protocol, create and implement a process that allows for the detection and management of disruptive and inappropriate behavior. This process should include education of all physicians and non-physicians regarding appropriate professional behavior and the development of policies and procedures. Refer to The Joint Commission's leadership standards.
- Red rules should be established, followed by staff and physicians and supported by leadership (see below for specific red rules suggested for this protocol).
    - Red rules are the few, key rules created to prevent/address the specific actions that pose the highest level of consequence and risk to safety of patients or staff. The intention is to develop solid habits around these rules so that they are followed consistently and accurately each time. Individual responsibility to adhere to each red rule is imperative to ensure the safest environment and delivery of the care process.
    - Suggested red rules:
        - Never operate on a patient without verifying the correct patient identity, correct procedure, and correct site.
        - Baseline counts are consistently performed before the patient arrives in the operating/procedure room unless parallel processing is used.
        - Unreconciled counts require imaging verification, and wound closure stops until count reconciliation is achieved.

Retained Foreign Object Implementation

- The work group recommends that a preformatted white board be used as the primary record of the count. Documenting counts on a white board allows all surgical staff, and in particular the scrub tech, to independently view the count record. A public display of the count record in an area where the entire surgical team can view it is likely to reinforce the importance of the count process.
- The work group also recommends that a count worksheet be used as a memory aid when the white board is not easily accessible in a timely manner. The count worksheet should be used only as a memory aid for the baseline count and, if needed, for subsequent counts. A piece of scratch paper should not be used. In contrast, if the whiteboard is located very close to the area when the count occurs, and if the circulating nurse can easily write the counts on the whiteboard without leaving the count area, there will be no need to use the count worksheet.
- Distractions and interruptions should be kept to a minimum during the count process. If a count is interrupted, then the category of items (e.g., laps) being counted will need to be recounted.

Surgical Infection Implementation

- Use of order sets limits divergent practices and improves compliance with best practice guidelines.
- Review patient education material to verify the message around no self-shaving before surgery. Distribute standardized patient education messages to surrounding outpatient clinics, as well.
- Remove all razors from the perioperative area.
- Use warming blankets, hats, and booties routinely for patients to prevent hypothermia.
- Establish an effective surveillance process that includes postdischarge or outpatient surveillance. Use inpatient case-finding for postdischarge or outpatient. It is important to include the following:
    - Use standardized definitions for surveillance of infections. These definitions also need to take into account the setting in which the surgical procedure was performed (acute care, ambulatory surgical center, etc.).
    - Establish a risk stratification for estimating surgical infection that adjusts for risk factors associated with infection for different care settings and procedures.
    - Work with surrounding outpatient clinics to develop communication strategy for tracking surgical infections and reporting back to the hospital.

Implementation Tools

Chart Documentation/Checklists/Forms

Patient Resources

Quality Measures

Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Related NQMC Measures

Perioperative protocol: percentage of patients undergoing elective non-high-risk surgery with a preoperative basic health assessment completed prior to the day of the scheduled procedure.

Perioperative protocol: percentage of patients undergoing elective non-high-risk surgery having laboratory tests/imaging unrelated to positive findings on preoperative basic health assessment.

Perioperative protocol: percentage of patients undergoing cataract surgery who have electrocardiograms performed as part of the preoperative assessment prior to cataract surgery.

Perioperative protocol: percentage of patients with comorbidities undergoing elective non-high-risk surgery who have appropriate management of comorbidities prior to surgery, including antithrombotic therapy, recent coronary stent/antiplatelet therapy, beta-blocker therapy, diabetes mellitus, sleep apnea, and nicotine cessation.

Perioperative protocol: percentage of patients with comorbidities undergoing elective non-high-risk surgery who have preoperative recommendations documented/communicated to the patient and/or surgical facility for all of the following applicable comorbidities: antithrombotic therapy, recent coronary stent/antiplatelet therapy, beta-blocker therapy, diabetes mellitus, sleep apnea, and nicotine cessation.

Perioperative protocol: percentage of patients with comorbidities who have preoperative education documented for all specified applicable comorbidities.

Perioperative protocol: percentage of patients who have canceled or delayed non-high-risk surgical procedures due to incomplete preoperative basic health assessment documentation.

Perioperative protocol: percentage of canceled or delayed surgical procedures due to ineffective communication regarding patient information as defined by organizational procedures.

Perioperative protocol: percentage of wrong surgery events per month.

Perioperative protocol: percentage of unintentionally retained foreign objects in surgical cases per month.

Perioperative protocol: percentage of preoperative wound infections by wound classifications: Class I: clean, Class II: clean contaminated, and Class III: contaminated.

Perioperative protocol: percentage of surgical patients with documentation of preoperative verification of correct patient, procedure and site/side/level.

Perioperative protocol: percentage of appropriate surgical patients who had their site marked by the surgeon in preoperative with his/her initials.

Perioperative protocol: percentage of surgical cases in which a verbal, active Time-Out has been conducted by all appropriate members of the surgical team prior to incision.

Perioperative protocol: percentage of surgical cases where the baseline count was conducted prior to the patient arriving in the operating/procedure room.

Perioperative protocol: percentage of surgical cases where counts were not reconciled and imaging was performed.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Safety

Identifying Information and Availability

Bibliographic Source(s)

Card R, Sawyer M, Degnan B, Harder K, Kemper J, Marshall M, Matteson M, Roemer R, Schuller-Bebus G, Swanson C, Stultz J, Sypura W, Terrell C, Varela N. Perioperative protocol. Health care protocol. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2014 Mar. 124 p. [124 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

1997 Sep (revised 2014 Mar)

Guideline Developer(s)

Institute for Clinical Systems Improvement - Nonprofit Organization

Guideline Developer Comment

The Institute for Clinical Systems Improvement (ICSI) is comprised of 50+ medical group and hospital members representing 9,000 physicians in Minnesota and surrounding areas, and is sponsored by five nonprofit health plans. For a list of sponsors and participating organizations, see the ICSI Web site.

Source(s) of Funding

- The Institute for Clinical Systems Improvement (ICSI) provided the funding for this guideline. The annual dues of the member medical groups and sponsoring health plans fund ICSI's work. Individuals on the work group are not paid by ICSI, but are supported by their medical group for this work.
- ICSI facilitates and coordinates the guideline development and revision process. ICSI, member medical groups, and sponsoring health plans review and provide feedback, but do not have editorial control over the work group. All recommendations are based on the work group's independent evaluation of the evidence.

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Committee on Evidence-Based Practice

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Financial Disclosures/Conflicts of Interest

The Institute for Clinical Systems Improvement (ICSI) has long had a policy of transparency in declaring potential conflicting and competing interests of all individuals who participate in the development, revision and approval of ICSI guidelines and protocols.

In 2010, the ICSI Conflict of Interest Review Committee was established by the Board of Directors to review all disclosures and make recommendations to the board when steps should be taken to mitigate potential conflicts of interest, including recommendations regarding removal of work group members. This committee has adopted the Institute of Medicine Conflict of Interest standards as outlined in the report Clinical Practice Guidelines We Can Trust (2011).

Where there are work group members with identified potential conflicts, these are disclosed and discussed at the initial work group meeting. These members are expected to recuse themselves from related discussions or authorship of related recommendations, as directed by the Conflict of Interest committee or requested by the work group.

The complete ICSI policy regarding Conflicts of Interest is available at the ICSI Web site .

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Guideline Status

This is the current release of the guideline.

This guideline updates previous versions: Danielson D, Bjork K, Card R, Foreman J, Harper C, Roemer R, Stultz J, Sypura W, Thompson S, Webb B. Preoperative evaluation. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2012 Jul. 61 p. [36 references]

Sawyer M, Danielson D, Degnan B, Dickson E, Doty S, Hamlin C, Harder K, Harper C, Matteson M, Moes R, Roemer R, Schuller-Bebus G, Swanson C, Terrell C, Webb B, Weisbrod C. Perioperative protocol. Health care protocol. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2012 Nov. 102 p. [147 references]

Guideline Availability

Available for purchase from the Institute for Clinical Systems Improvement (ICSI) Web site . Also available to ICSI members for free at the ICSI Web site and to Minnesota health care organizations free by request at the ICSI Web site .

Availability of Companion Documents

The appendices of the original guideline document (see the "Guideline Availability" field) include preoperative questionnaires for adults and children; drug information such as drugs to stop or continue, antibiotic selection and dosing tables, and an overview of topical antiseptics used for preoperative skin preparation; and the Veterans Administration methodical wound exploration process.

Patient Resources

A patient preoperative guide is available in the Appendix A of the original guideline document (see the "Guideline Availability" field).

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

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